Rapid Watershed Assessment
Crow Wing
(MN) HUC: 07010106

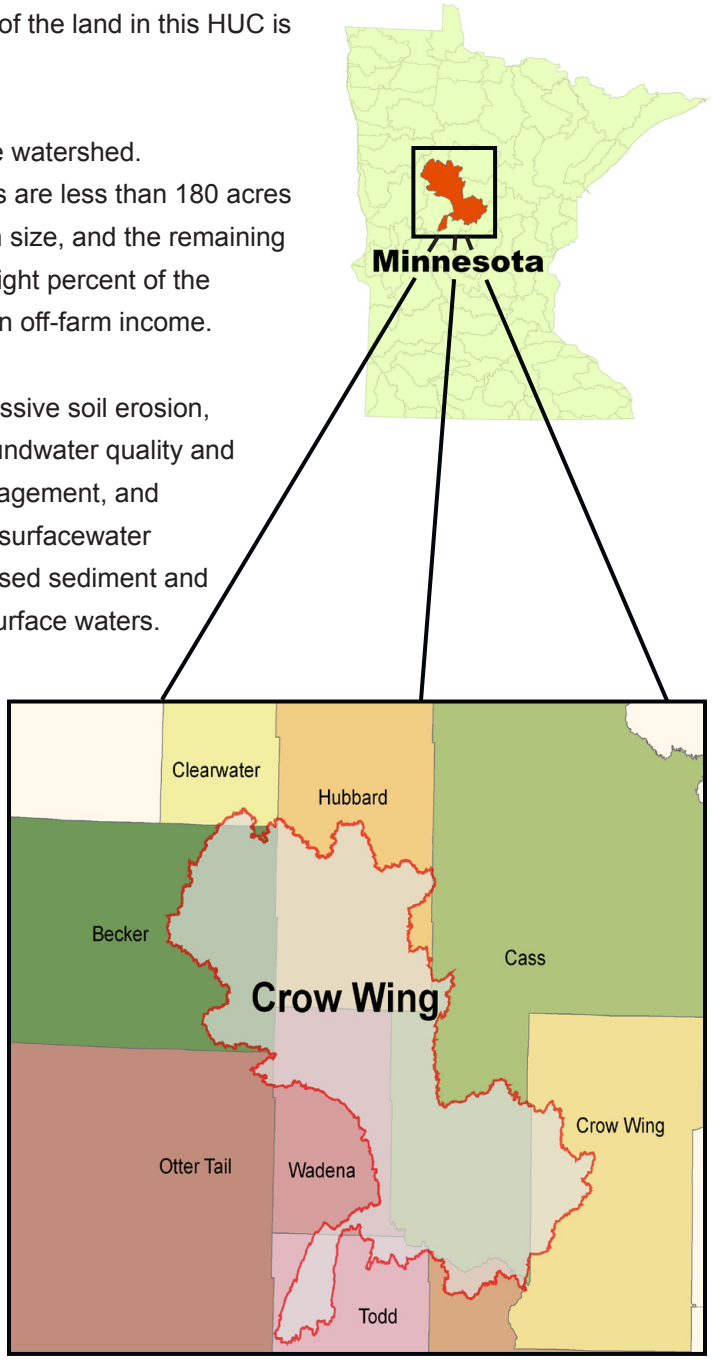
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land–owners and local leaders set priorities and determine the best actions to achieve their goals.

Introduction

The Crow Wing 8-Digit Hydrologic Unit Code (HUC) subbasin is located in the Northern Lakes and Forest and North Central Hardwoods Forest ecoregions of Minnesota. This largely forested watershed is 1,245,755 acres in size. Approximately seventy two percent of the land in this HUC is privately owned.

Assessment estimates indicate 1,434 Farms in the watershed. Approximately fifty seven percent of the operations are less than 180 acres in size, forty percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size. Fifty eight percent of the producers are full time operators and do not rely on off-farm income.

The main resource concerns in the basin are excessive soil erosion, woodland management, surfacewater quality, groundwater quality and quantity, surfacewater management, wetland management, and riparian development issues. Associated with the surfacewater management and riparian development are increased sediment and pollutant (mercury, excess nutrients) loadings to surface waters. Declining wildlife habitat is also a concern.



County Totals

County	*Acres in HUC*	*% HUC*
Clearwater	4,842	0.4%
Cass	354,719	28.5%
Hubbard	313,572	25.2%
Becker	222,467	17.9%
Wadena	182,398	14.6%
Crow Wing	73,772	5.9%
Otter Tail	4,642	0.4%
Todd	67,537	5.4%
Morrison	21,806	1.8%
Total acres:	**1,245,755**	**100%**

Physical Description

Average elevation in the Crow Wing subbasin is 1,357 feet above sea level, with the highest values being in the Western and extreme Northwestern portions of the watershed, while the lowest are found across the Southern and Southeastern regions.

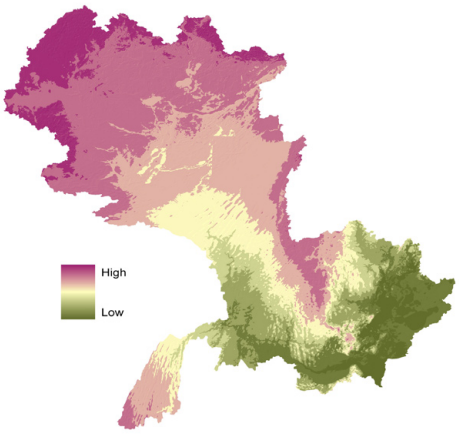
Precipitation in the watershed ranges from 25 to 27 inches annually. Evaporation estimates are between 30 to 32 inches annually (Minnesota State Climatologists Office, 1999).

Most lands within this HUC are not highly erodible, and are moderately suited to agricultural uses. Predominate land uses / land covers are Forest (51%), Grass Pasture/Hay (14%), Wetlands (11%), Row Crops (10%), and Open Water (6.6%).

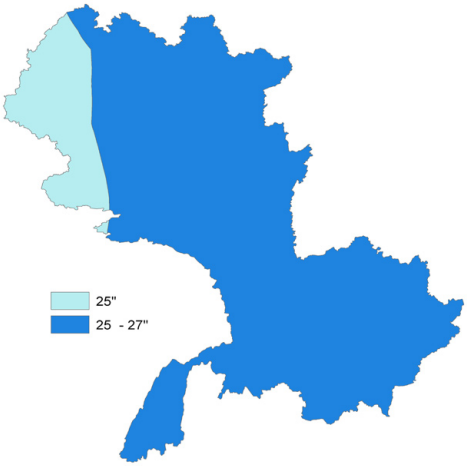
Land use within the watershed is moderately agricultural, accounting for approximately 25% of the available acres.

Development pressure is moderate to considerable in some areas, with occasional farms, timberland, and lakeshore being parceled out for recreation, lake or country homes.

Relief

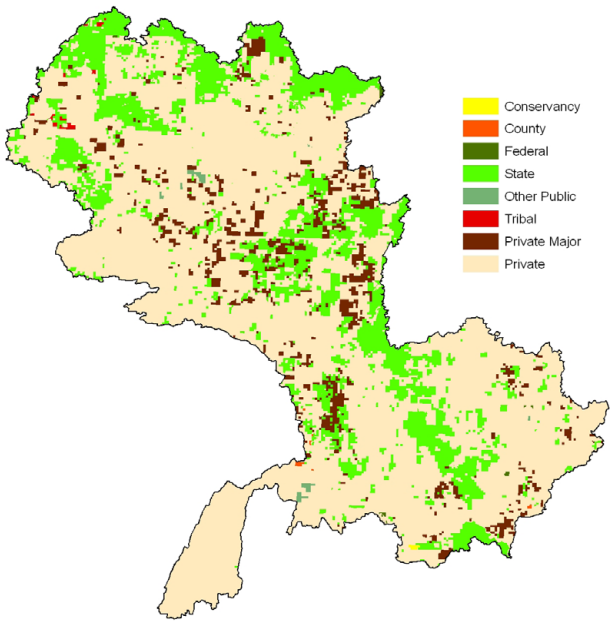


Average Precipitation



Ownership[1]

Ownership Type*	Acres	% of HUC
Conservancy	333	0.03
County	593	0.05
Federal	886	0.07
State	265,629	21.3
Other	2,432	0.2
Tribal	1,891	0.15
Private Major	74,693	6.0
Private	899,298	72.2
Total Acres:	**1,245,755**	**100%**

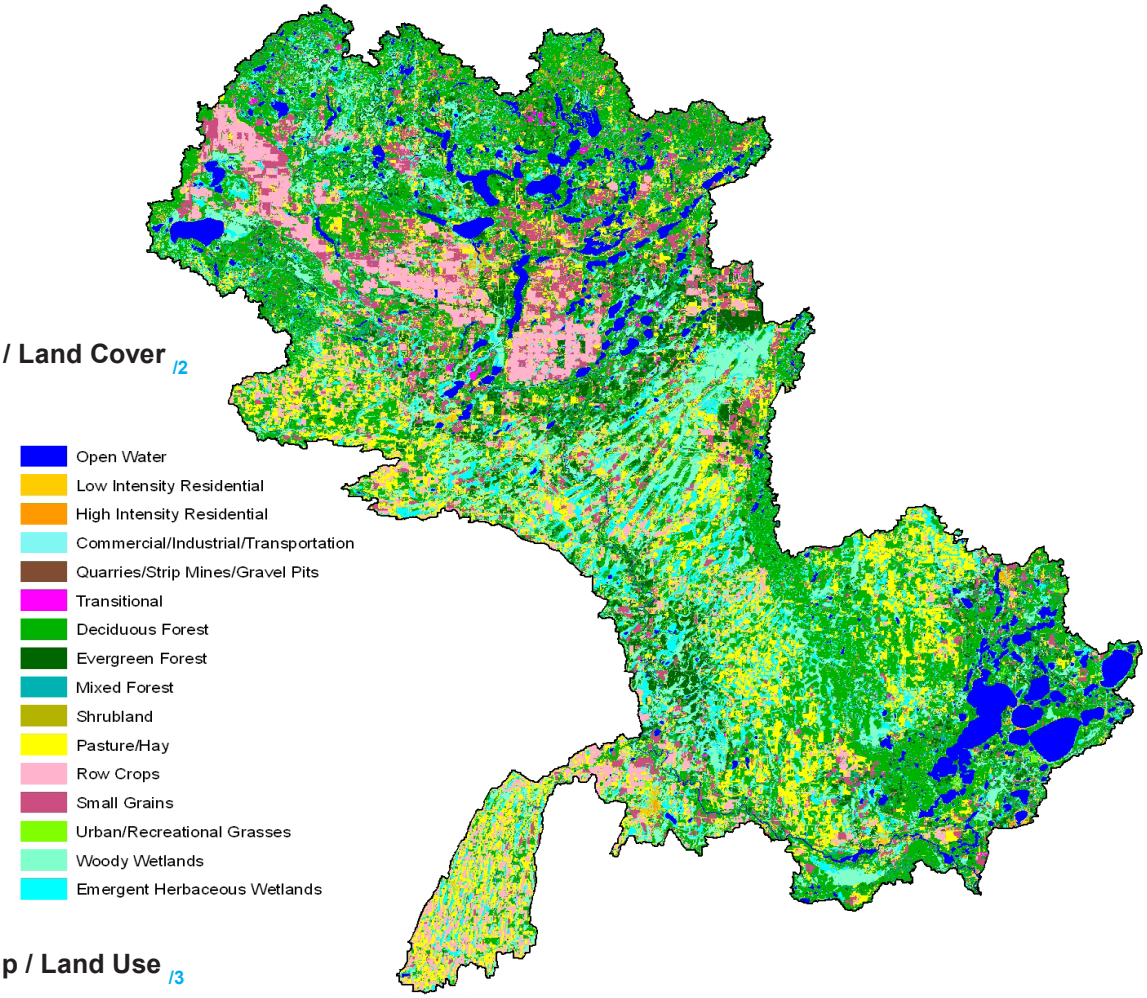


* Ownership totals derived from 2007 MN DNR GAP Stewardship Coverage data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

Ownership / Land Use

The Crow Wing watershed covers an area of 1,245,755 acres. Approximately seventy two percent of the land in the watershed is owned by private landholders (899,298 acres). The second largest ownership type is State, with approximately 265,629 acres (21%), followed by Private Major (Corporate Holdings) with 74,693 acres (6%), Miscellaneous "Other" Public land with 2,432 acres (0.2%) and Tribal with 1,891 acres (0.15%). Federally owned land amounts to 886 acres (0.07%), the various counties of the watershed hold 593 acres (0.05%), and Conservancy lands account for the smallest class, covering 333 acres (0.03%). Land use by ownership type is represented in the table below.

Land Use / Land Cover /2



Ownership / Land Use /3

	Public		Private**		Tribal			
Landcover/Use	**Acres**	**% Public**	**Acres**	**% Private**	**Acres**	**% Tribal**	**Total Acres**	**Percent**
Forest	204,051	16.4%	432,585	34.7%	1,052	0.1%	637,687	51.2%
Grass, etc	5,762	0.5%	168,596	13.5%	40	0.0%	174,398	14.0%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	3,769	0.3%	124,954	10.0%	109	0.0%	128,832	10.3%
Shrub etc	10,250	0.8%	34,371	2.8%	37	0.0%	44,658	3.6%
Wetlands	31,987	2.6%	102,591	8.2%	212	0.0%	134,790	10.8%
Residential/Commercial	3,134	0.3%	39,563	3.2%	86	0.0%	42,783	3.4%
Open Water*	6,155	0.5%	76,376	6.1%	70	0.0%	82,601	6.6%
* ownership undetermined			** includes private-major					
Watershed Totals:	**265,107**	**21.28%**	**979,036**	**78.6%**	**1,606**	**0.1%**	**1,245,755**	**100%**

Physical Description (continued)

		ACRES	cu. ft/sec
Stream Flow Data	USGS 05243725 STRAIGHT RIVER NEAR PARK RAPIDS, MN	**Total Avg.**	58.1
		May – Sept. Avg.	47.68
		ACRES/MILES	**PERCENT**
Stream Data[4] *(*Percent of Total HUC Stream Miles)*	Total Miles – Major (100K Hydro GIS Layer)	2616.5	---
	2006 303d/TMDL Listed Streams	116.7	4.5%
Riparian Land Cover/Land Use[5] *(Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)*	**Land Use Type**	**Acres**	**Percent**
	Forest	29,136	46.4%
	Grain Crops	0	0.0%
	Grass, etc	4,197	6.7%
	Orchards	0	0.0%
	Row Crops	1,799	2.9%
	Shrub etc	1,674	2.7%
	Wetlands	11,818	18.8%
	Residential/Commercial	1,180	1.9%
	Open Water	13,018	20.7%
	Total Buffer Acres:	**62,823**	100%
Crop and Pastureland Land Capability Class[6] *(Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)*	**1** – slight limitations	0	0%
	2 – moderate limitations	38,100	25%
	3 – severe limitations	113,200	35%
	4 – very severe limitations	93,700	29%
	5 – no erosion hazard, but other limitations	2,100	1%
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	35,600	11%
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	0	0%
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%
	Total Croplands & Pasturelands	**327,700**	**---**

	TYPE OF LAND	ACRES	% of Irrigated Lands	% of HUC
Irrigated Lands[7] *(1997 NRI Estimates for Non-Federal Lands Only)*	**Cultivated Cropland / Pastureland**	48,300	100%	3.8%
	Uncultivated Cropland	0	0%	0%
	Total Irrigated Lands	48,300	---	3.8%

Assessment of Waters

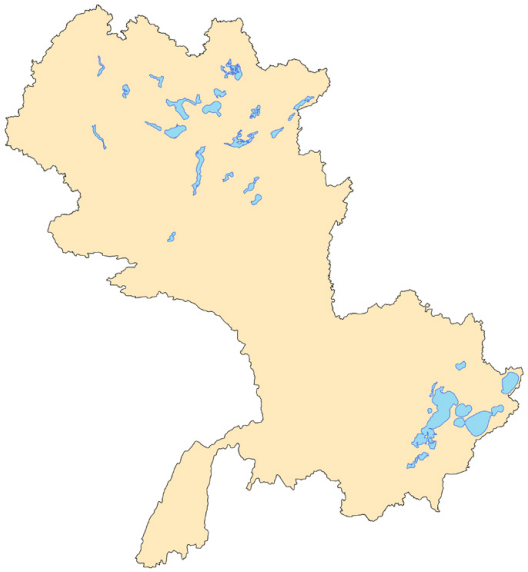
Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury. The Clean Water Act requires the Minnesota Pollution Control Agency (MPCA) to identify and restore impaired waters.

2006 Minnesota 303d Listed Streams - Crow Wing Watershed

Listed Stream / Reach [8]	Impairment	Affected Use
Crow Wing River Gull R to Mississippi R	Mercury	Aquatic Consumption
Crow Wing River Seven Mile Cr to Gull R	Mercury	Aquatic Consumption
Crow Wing River Long Prairie R to Seven Mile Cr	Mercury	Aquatic Consumption
Crow Wing River Mosquito Cr to Long Prairie R	Mercury	Aquatic Consumption
Crow Wing River Swan Cr to Mosquito Cr	Mercury	Aquatic Consumption
Crow Wing River Partridge R to Swan Cr	Mercury	Aquatic Consumption
Crow Wing River Leaf R to Partridge R	Mercury	Aquatic Consumption
Crow Wing River Farnham Cr to Leaf R	Mercury	Aquatic Consumption
Crow Wing River Beaver Cr to Farnham Cr	Mercury	Aquatic Consumption
Crow Wing River Cat R to Beaver Cr	Mercury	Aquatic Consumption
Crow Wing River Big Swamp Cr to Cat R	Mercury	Aquatic Consumption
Crow Wing River Shell R to Big Swamp Cr	Mercury	Aquatic Consumption
Farnham Creek Unnamed Cr to Crow Wing R	Fish & Invert IBI	Aquatic Life
Crow Wing River HDWTRS (11th Crow Wing Lk) to Shell R	Mercury	Aquatic Consumption
Long Prairie River Fish Trap Cr to Crow Wing R	Mercury, Low Dissolved Oxygen	Aquatic Consumption

Assessment of Waters (continued)

2006 Minnesota 303d Listed Lakes - Crow Wing Watershed

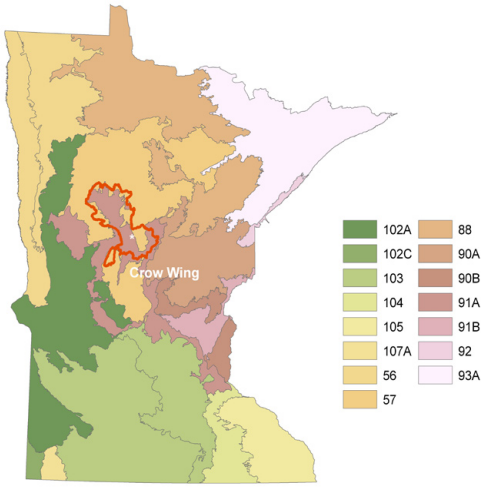


Listed Lake	Impairment	Affected Use
Straight	Mercury	Aquatic Consumption
Two Inlets	Mercury	Aquatic Consumption
Boot	Mercury	Aquatic Consumption
Agate	Mercury	Aquatic Consumption
Margaret	Excess nutrients	Aquatic Recreation
Sylvan	Mercury	Aquatic Consumption
Gull	Mercury	Aquatic Consumption
Edward	Mercury	Aquatic Consumption
North Long	Mercury	Aquatic Consumption
Round	Mercury	Aquatic Consumption
Lower Cullen	Mercury	Aquatic Consumption
Eleventh Crow Wing	Mercury	Aquatic Consumption
Tenth Crow Wing	Mercury	Aquatic Consumption
Eighth Crow Wing	Excess nutrients	Aquatic Recreation
Third Crow Wing	Mercury	Aquatic Consumption
First Crow Wing	Excess nutrients	Aquatic Recreation
Spider	Mercury	Aquatic Consumption
Big Stony	Mercury	Aquatic Consumption
Belle Taine	Mercury	Aquatic Consumption
Mantrap	Mercury	Aquatic Consumption
Long	Mercury	Aquatic Consumption
Lower Bottle	Mercury	Aquatic Consumption
Blue	Mercury	Aquatic Consumption
Big Sand	Mercury	Aquatic Consumption
Fish Hook	Mercury	Aquatic Consumption
Potato	Mercury	Aquatic Consumption
Portage	Excess nutrients	Aquatic Recreation and Consumption
Island	Mercury	Aquatic Consumption
Stocking	Mercury	Aquatic Consumption

Common Resource Areas

The Crow Wing Watershed encompasses two common resource areas, CRA 91A.1 and 57.1. /9

57.1 Northern Minnesota Till Moraine: Rolling glacial moraine and associated outwash with short, choppy and complex slopes. Soils are generally loamy with some clayey and sandy soils included. Organic soils occur in depressions. Land use is cropland, pasture timber and recreation. Numerous lakes occur in this region. Main crops are small grain, soybeans and forage crops. Resource concerns include improved drainage for crop production, grazing management of forest and grassland, water and wind erosion and water quality impacts.



91A.1 Central Minnesota Outwash: Nearly level to gently sloping well drained sandy soils on outwash plains and stream terraces. There are also numerous poorly and very poorly drained mineral and organic soils. Irrigated crop land, pasture and hayland are the major land uses. Forestland is common in parts. Corn, soybeans, edible beans and potatoes are the primary irrigated crops. Forage crops are also extensively grown. Resource concerns are wind erosion water quality, nutrient management, improperly managed grazing.

Only the major CRA units are described above. For further information, go to:
http://soils.usda.gov/survey/geography/cra.html

Geology / Soils /10

The four major types of soils within the watershed include Alfisols, Entisols, Mollisols and some spot localized Histosols in the wetland areas.

In the watershed, the bedrock geology consists of primarily Precambrian crystalline rocks and some Cretaceous era rocks (Sims and Morey, 1972, Stark et al, 1996). The Crow Wing River Watershed lies within calcareous glacial deposits associated with the Des Moines Lobe and the Wadena Lobe Associations and the siliceous glacial deposits associated with the Rainy Lobe Associations.

The bedrock hydrogeology and ground water in the Crow Wing River Watershed consists of primarily Precambrian igneous and metamorphic rocks, pockets of Cretaceous aquifers in Becker and Otter Tail Counties. The surfacial aquifers are glacial outwash consisting of course-grained sands and finegrained alluvium of calcareous and silicoeous depots.

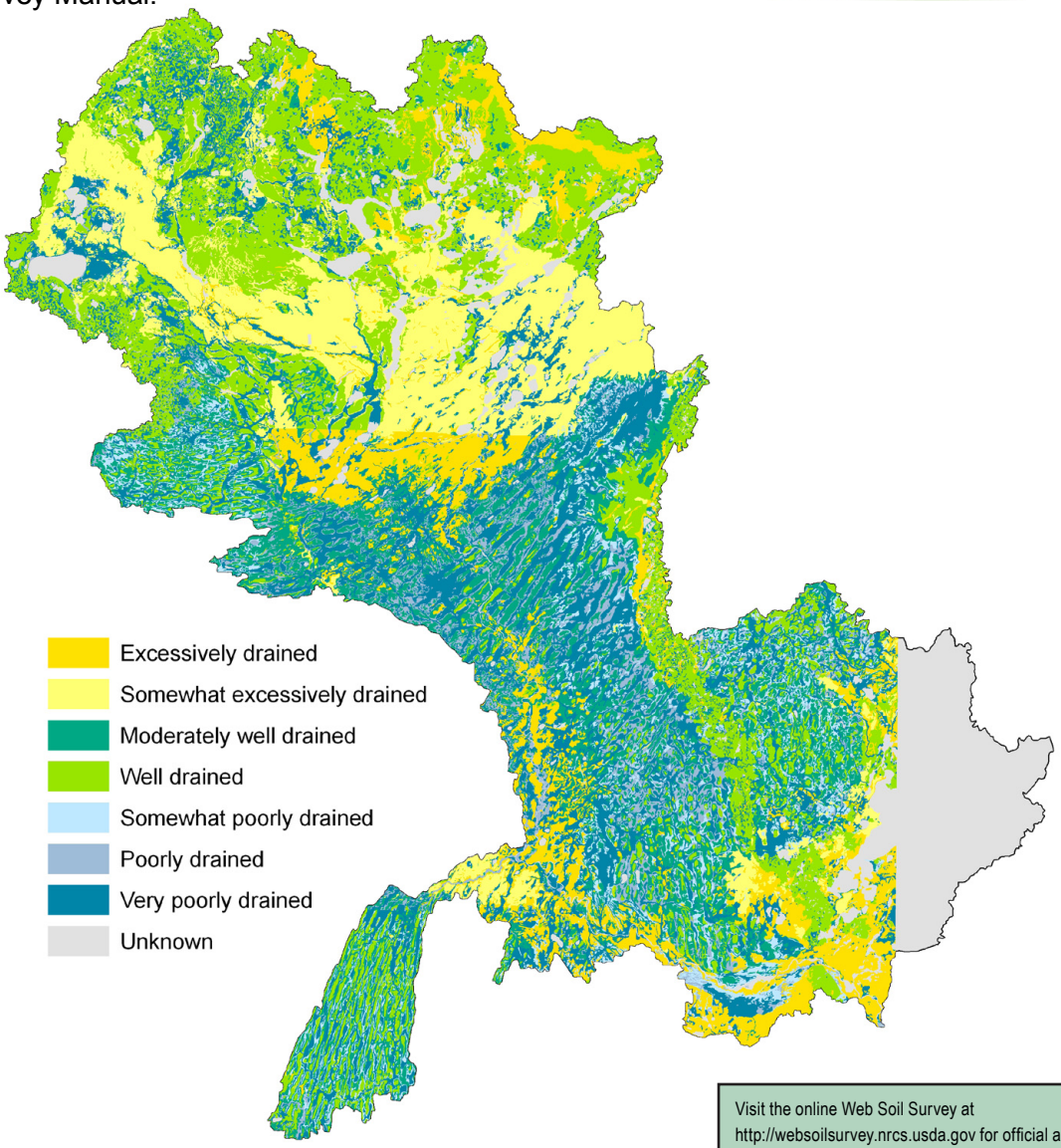
The glacial till consists of calcareous and siliceous deposits. In some areas of the watershed these glacial deposits of sand and gravel are up to 600 feet deep.

Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.

Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized–excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the Soil Survey Manual.



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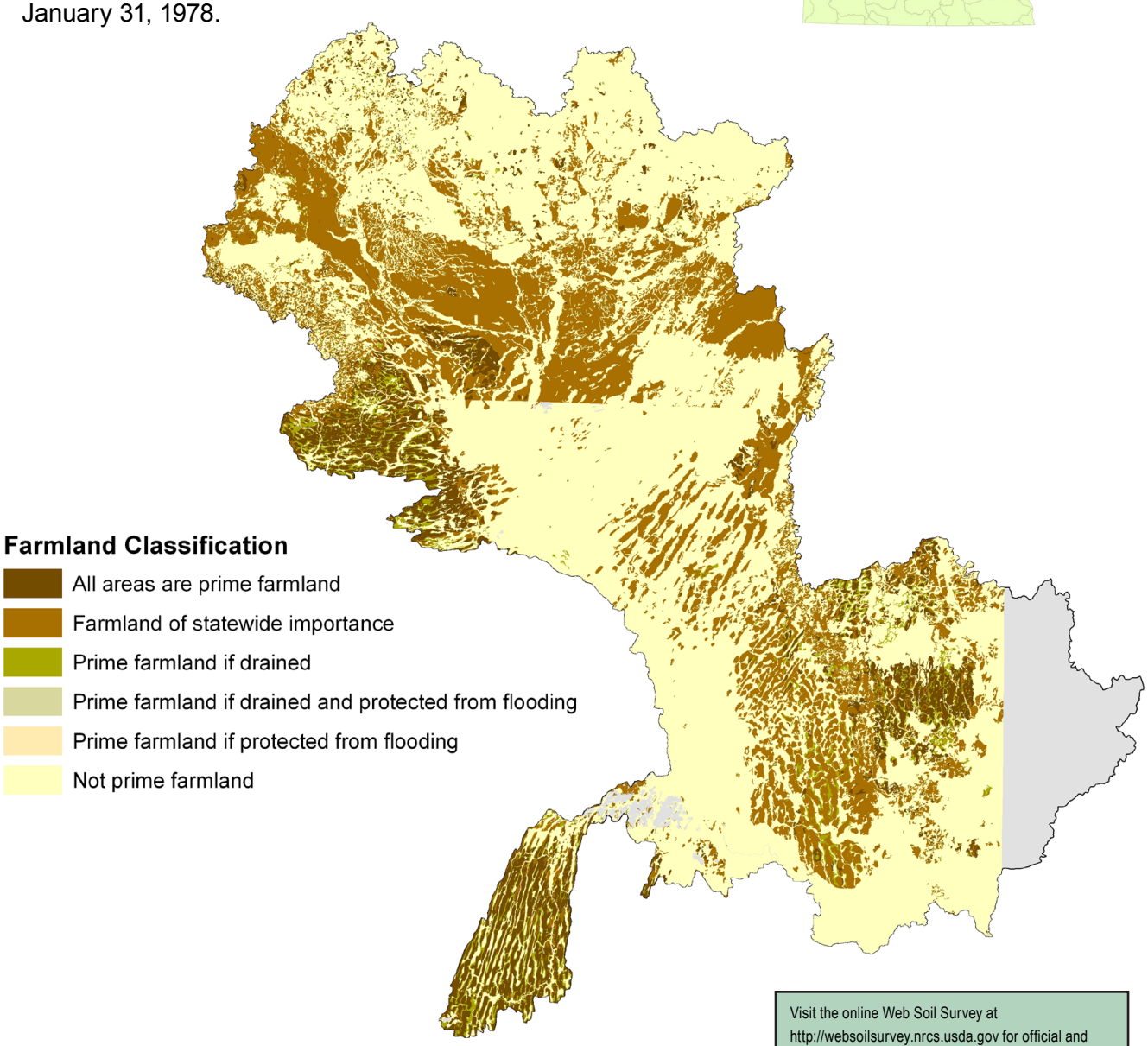
Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.



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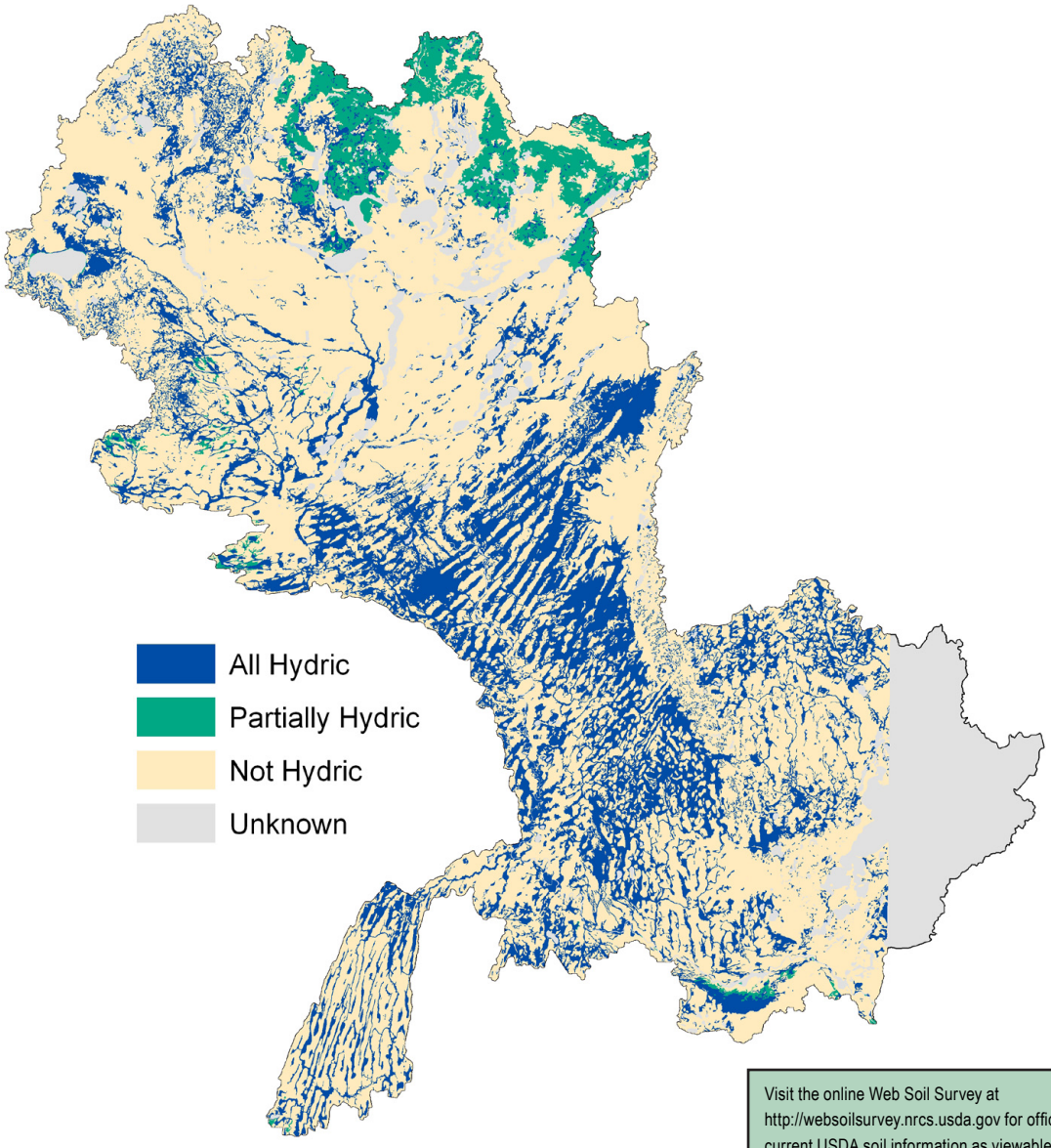
Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non–hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.



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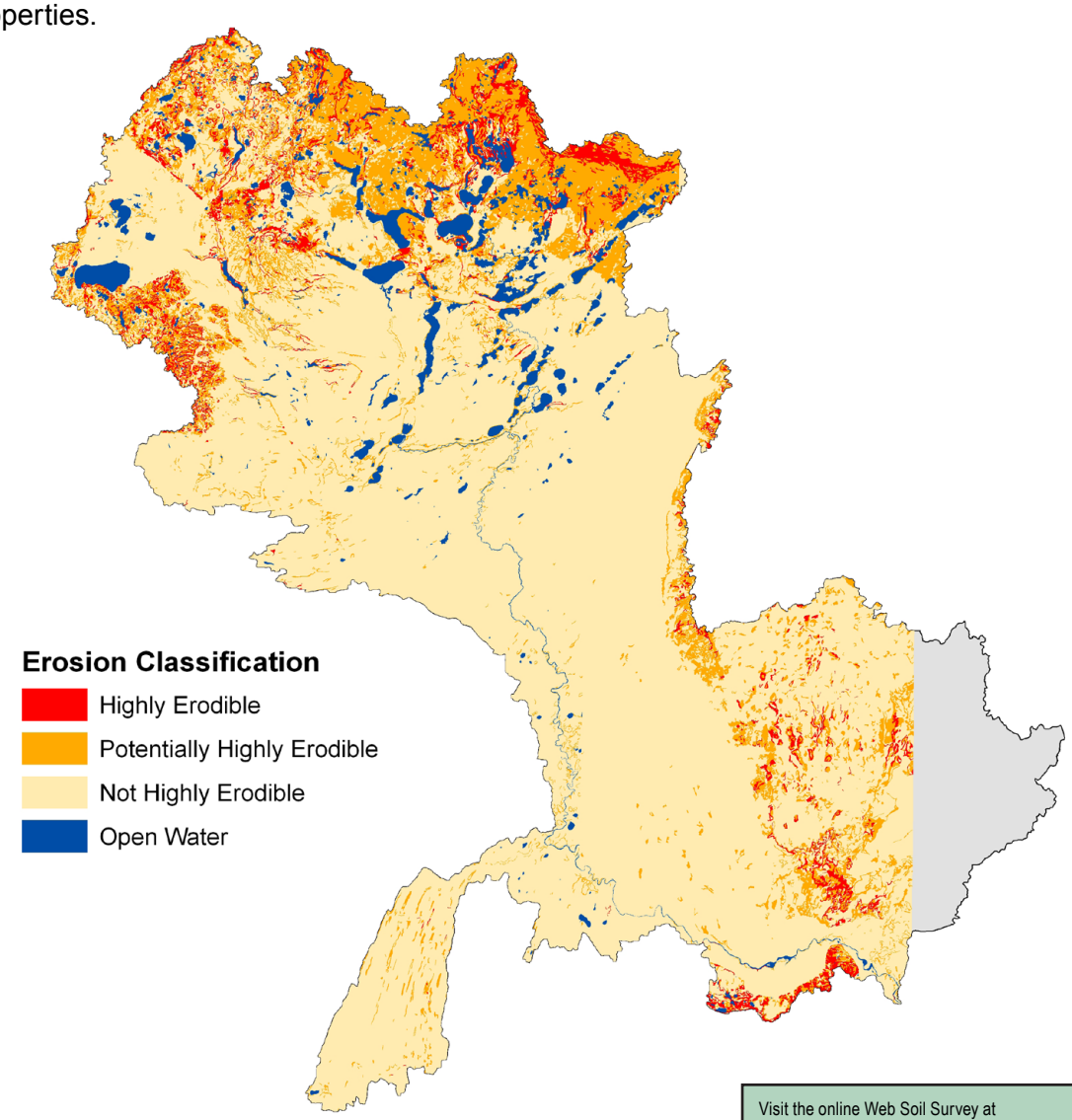
Highly Erodible Land (HEL)

The erodibility index (EI) for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil in the FOTG as of January 1, 1990.

A soil map unit with an EI of 8 or greater is considered to be highly erodible land (HEL).

Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.



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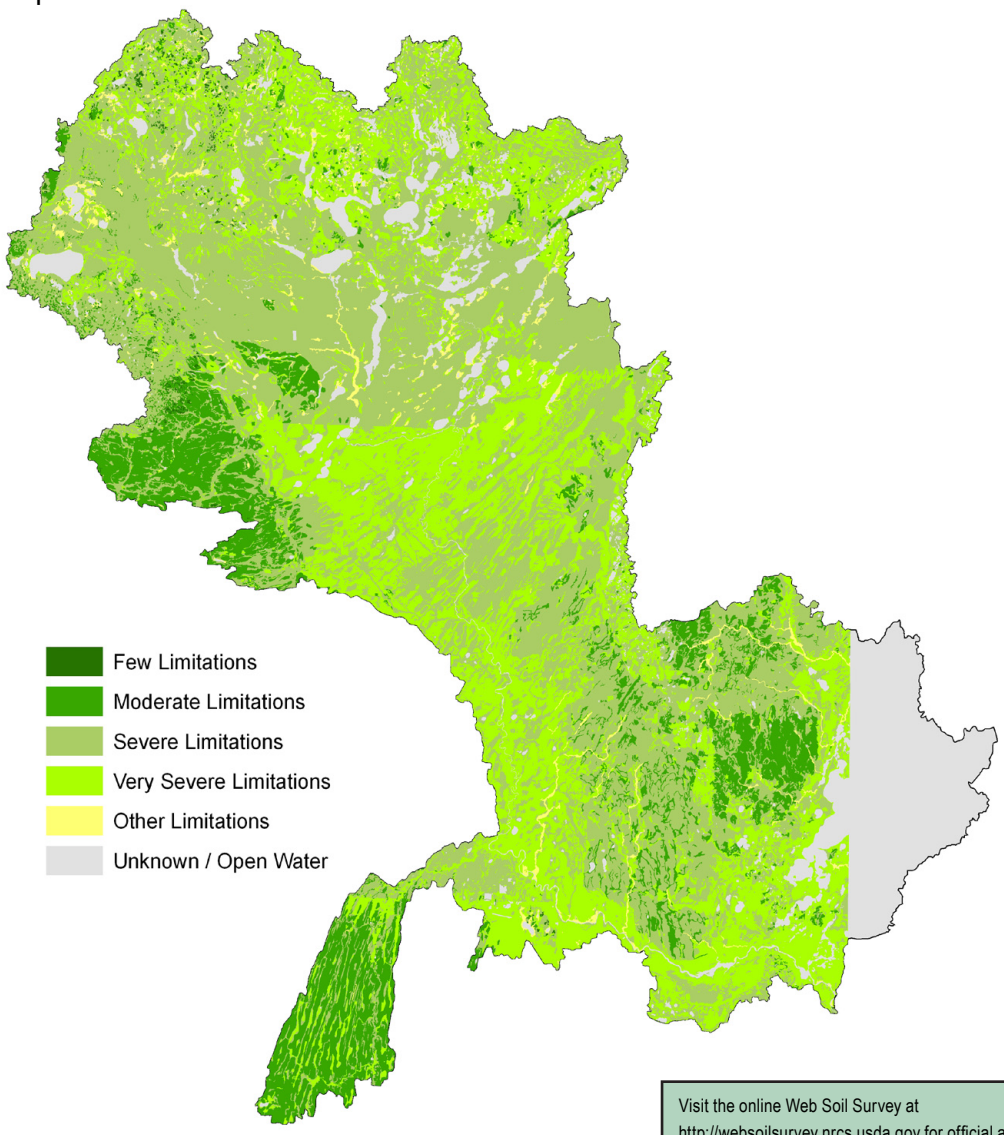
Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



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Performance Results System Data

Watershed Name: Crow Wing				Watershed Number: 7010106						
PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	TOTAL
Total Conservation Systems Planned (acres)	7,149	12,874	0	6,397	3,100	N/A	5,340	8,442	7,121	50,423
Total Conservation Systems Applied (acres)	2,636	6,006	0	6,914	6,914	N/A	2,590	6,165	5,563	36,788
Conservation Practices										
Total Waste Management (313) (numbers)	0	3	2	0	0	0	0	0	0	5
Riparian Forest Buffers (391) (acres)	2	46	378	400	183	28	26	42	10	1,115
Erosion Control Total Soil Saved (tons/year)	2,026	56,923	27,166	33,221	8,990	N/A	N/A	N/A	N/A	128,326
Total Nutrient Management (590) (Acres)	680	1,716	1,887	366	1,006	0	1,030	1,030	352	8,067
Pest Management Systems Applied (595A) (Acres)	0	0	0	158	0	0	134	0	0	292
Prescribed Grazing 528a (acres)	0	1,183	748	848	1,245	859	28	173	173	5,257
Tree & Shrub Establishment (612) (acres)	12,236	606	942	1,047	528	1,225	256	173	162	17,175
Residue Management (329A-C) (acres)	0	0	0	805	80	72	72	809	109	1,947
Total Wildlife Habitat (644 - 645) (acres)	2,003	2,103	1,348	3,425	1,074	1,326	3,425	227	267	15,198
Total Wetlands Created, Restored, or Enhanced (acres)	0	28	12	45	109	1	0	8	82	285
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	1,614	2,586	439	2,124	1,270	N/A	466	765	181	9,445
Wetlands Reserve Program	0	0	0	0	0	N/A	58	0	43	101
Environmental Quality Incentives Program	790	1,891	870	886	1,601	N/A	1,555	2,685	3,095	13,373
Wildlife Habitat Incentive Program	232	0	155	0	0	N/A	21	15	0	423
Farmland Protection Program	0	0	0	0	0	N/A	0	0	0	0

THREATENED AND ENDANGERED SPECIES /14

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered and candidate species as well as species of special concern that occur in the subbasin.

Scientific Name	Common Name	Type
Ammodramus henslowii	Henslow's Sparrow	Zoological
Ammodramus nelsoni	Nelson's Sharp-tailed Sparrow	Zoological
Buteo lineatus	Red-shouldered Hawk	Zoological
Cicindela patruela patruela	Northern Barrens Tiger Beetle	Zoological
Cirsium hillii	Hill's Thistle	Botanical
Cladium mariscoides	Twig-rush	Botanical
Coturnicops noveboracensis	Yellow Rail	Zoological
Cypripedium arietinum	Ram's-head Lady's-slipper	Botanical
Dalea candida var. oligophylla	White Prairie-clover	Botanical
Eleocharis olivacea	Olivaceous Spike-rush	Botanical
Emydoidea blandingii	Blanding's Turtle	Zoological
Etheostoma microperca	Least Darter	Zoological
Haliaeetus leucocephalus	Bald Eagle	Zoological
Lasmigona compressa	Creek Heelsplitter	Zoological
Ligumia recta	Black Sandshell	Zoological
Malaxis monophyllos var. brachypoda	White Adder's-mouth	Botanical
Malaxis paludosa	Bog Adder's-mouth	Botanical
Microtus ochrogaster	Prairie Vole	Zoological
Najas gracillima	Thread-like Naiad	Botanical
Notropis anogenus	Pugnose Shiner	Zoological
Phalaropus tricolor	Wilson's Phalarope	Zoological
Poa paludigena	Bog Bluegrass	Botanical
Sparganium glomeratum	Clustered Bur-reed	Botanical
Tympanuchus cupido	Greater Prairie-chicken	Zoological

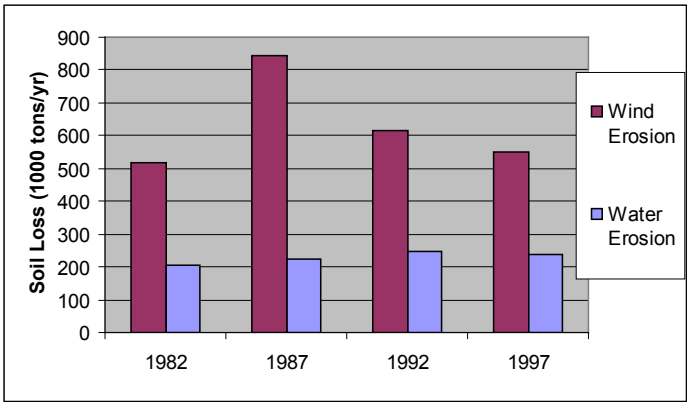
RESOURCE CONCERNS

County Soil and Water Conservation Districts in the watershed have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

- **Soil Quality, Excessive Gully and Sheet and Rill Erosion.** Agricultural runoff and sedimentation caused by the clearing and grading of shoreland property is neither desirable nor necessary. Erosion issues relate directly to lake pollution/eutrophication and shoreland development, and compound effects of erosion from agricultural lands.
- **Woodland Management.** Management opportunities include planting trees or shrubs, restoring prairies and savannas, timber stand improvement, timber sales, enhancing wildlife habitat, prescribed burning, and the contol of invasive woodland species.
- **Surface Water Quality, Nutrients, Priority Pollutants.** Reduction of priority pollutants and sediments in surface waters is a priority issue throughout the watershed. Excessive amounts of sediments, nutrients, and bacteria degrade the water quality causing a fish community with depressed populations and limited diversity. Mercury levels are affecting the health of Aquatic communities, and affecting the consumption of fish in many area lakes.
- **Ground Water Quality, Nutrients, Organics, Animal and Human Wastewater managment.** Aging septic systems, feedlot runoff, nutrient runoff, tilling practices, improper closure of old manure pits, and abandoned wells all pose threats to groundwater quality throughout the region. Improved management of wastewater ensures safe water for all uses.
- **Ground Water Quantity.** Land alterations have transformed the flow, retention, and replenishment of the hydrologic cycle. Pattern tiling, ditching, wetland removal, development, stormwater drainage, excessive groundwater use, etc. have resulted in the cumulative effect of rapidly transporting a greater amount of water to major rivers and streams, and away from groundwater recharge potential.
- **Stormwater Management.** Local districts recognize that runoff volume will likely increase as development of the watershed continues. Districts seek to require that peak runoff rates be kept below the capacity of downstream conveyance facilities through the use of retention facilities.
- **Wetland Management, Surface Water Management, Gully Control.** Drained wetlands, crop production in flood prone areas, and aging dams all diminish surface water quality and productivity. Restoration and enhancement of wetlands, dam and drainage system repair, and removing flood-prone lands from production all serve to lessen the impact of flooding, improve drainage, and improve the vitality of existing wetlands

NRI Erosion Estimates

- Sheet and rill erosion by water on the cropland and pastureland have increased by approximately 31,500 tons (15.2%) of soil from 1982 to 1997.
- NRI estimates indicate wind erosion rates decreased by 32,000 tons (6.1%) between 1982 and 1997. /13



Socioeconomic and Agricultural Data (Relevant)

Estimations for the Crow Wing subbasin indicate a current population of just over 43,530 people. Median household income throughout the area is $36,727 yearly, roughly 79% of the national average. Unemployment in the subbasin is estimated at 5.9%, and approximately 12% of the residents in the watershed are below the national poverty level.

Assessment estimates indicate 1,434 Farms in the watershed. Approximately fifty seven percent of the operations are less than 180 acres in size, forty percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size. Of the 1,348 operators in the basin, fifty four percent are full-time producers not reliant on off-farm income.

(MN) HUC# 7010106		Total Acres:	1,245,755
Population Data*	Watershed Population	43,532	
	Unemployment Rate	5.9%	
	Median Household Income	36,727	
	% below poverty level	12%	
	Median Value of Home	82,700	
Farm Data	# of Farms	1,434	
	# of Operators	1,348	**Percent**
	# of Full Time Operators	728	54%
	# of Part Time Operators	620	46%
	Total Cropland Acres	**223,044**	17.9%
Farm Size	1 to 49 Acres	14	17%
	50 to 179 Acres	33	40%
	180 to 499 Acres	26	32%
	500 to 999 Acres	7	8%
	1,000 Acres or more	3	4%
	Average Farm Size	**50**	
Livestock & Poultry	Cattle - Beef	12,238	2%
	Cattle - Dairy	7,105	1%
	Chicken	37,589	7%
	Swine	7,214	1%
	Turkey	197,899	37%
	Other	267,014	50%
	Animal Count Total:	**529,060**	
	Total Permitted AFOs:	**400**	
Chemicals (Acres Applied)	Insecticides	11,274	
	Herbicides	62,984	
	Wormicides	697	
	Fruiticides	996	
	Total Acres Treated	**75,950**	
	% State Chemical Totals	**0.5%**	

Watershed Projects, Plans and Monitoring

- **Biological & Toxicological Assessment**
  Minnesota Pollution Control Agency
- **Mississippi River Env. Management Program**
  US Army Corps of Engineers
- **MIssissippi River Watch**
  Mississippi Headwaters Board
- **Mississippi River Defense Network**
  Legislative Commission on Minnesota Resources
- **Upper Mississippi River Basin W.Q. Plan**
  Minnesota Pollution Control Agency
- **Upper Mississippi River Initiative**
  National Audobon Society
- **Upper Mississippi River Basin Planning**
  Minnesota Pollution Control Agency
- **Upper Mississippi Source Water Protection Project**
  Minnesota Department of Health
- **Upper Mississippi River WS Forest Partnership**
  USDA Forest Service
- **Upper Mississippi River Watershed Fund**
  USDA Forest Service / National Fish & Wildlife Federation

*** Have a watershed project you'd like to see included? Submit suggestions online @ http://www.mn.nrcs.usda.gov/technical/rwa/**

Conservation Districts, Organizations & Partners

- **Becker County SWCD**
  809 - 8th St SE, Detroit Lakes, MN 56501
  Phone (218) 846-7360
- **Beltrami County SWCD**
  3217 Bemidji Ave North Suite #3, Bemidji, MN 56601
  Phone (218) 755-4339
- **Cass County SWCD**
  303 Minnesota Avenue W Walker, MN 56484-3000
  Phone (218) 547-7399
- **Clearwater County SWCD**
  312 Main Ave N Ste 3, Bagley, MN 56621
  Phone (218) 694-6845
- **Crow Wing County SWCD**
  7118 Clearwater Rd, Baxter, MN 56425
  Phone (218) 828-6197
- **Crow Wing Lakes and Rivers Alliance**
  7118 Clearwater Road, Baxter, MN
  Phone 218 692 3439
- **Hubbard County SWCD**
  212 1/2 - 2nd St W, Park Rapids, MN 56470
  Phone (218) 732-0121
- **Friends of the Mississippi River**
  360 N Robert St Saint Paul, MN 55101
  Phone (651) 222-2193
- **Morrison County SWCD**
  6776 Heron Rd, Little Falls, MN 56345
  Phone (320) 616-2479
- **West Central Minnesota Joint Powers Board**
  809 SE 8th St, Detroit Lakes, MN 56501
  Phone (218) 847-9392
- **Ottertail County SWCD, East**
  801 Jenny Ave SW Ste 2, Perham, MN 56573
  Phone (218) 346-4260
- **Thirty Lakes Watershed District**
  17064 Commercial Park Road Brainerd, MN 56401
  Phone (218) 828-0243
- **Todd County SWCD**
  607 9th St NE, Long Prairie, MN 56347
  Phone (320) 732-2644
- **Wadena County SWCD**
  4 Alfred St NE, Wadena, MN 56482-2303
  Phone (218) 631-3195

Footnotes / Bibliography

1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc, 2007. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. Land interest is expressed only when some organization owns or administers more than 50% of a forty except where DNR could create sub-forty accuracy polygons.

2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 19990631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.

3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.

4. USGS 1:100,000 Hydrography Layer .This data set represents all features coded as 'rivers' on the USGS 1:100,000-scale DLG Hydrography data set. This current version was converted to ARC/INFO by the Land Management Information Center and edge-matched across map sheet boundaries. Minnesota DNR made further modifications to the files, verified lake feature identifiers, and created a state layer from the separate 100k data. The Hydro 100k layer was compared to MPCA's 303(d) data to derive percentage of listed waters.

5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.

6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: http://www.nrcs.usda.gov/technical/NRI/

7. 1997 NRI Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. [NRI-97] For more information: http://www.nrcs.usda.gov/technical/NRI/

8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. http://www.pca.state.mn.us/water/tmdl/index.html#maps.

Footnotes / Bibliography (continued)

9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at http://soildatamart.nrcs.gov. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Addendum and publication dates vary by county.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm (7/30/04). CREP Acres: http://www.bwsr.state.mn.us/easements/crep/easementsummary.html (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. http://www.nrcs.usda.gov/Technical/efotg/. Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 http://www.nmfs.noaa.gov/sfa/magact/

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, http://www.nrcs.usda.gov/programs/watershed/Purpose. Additional Information on listed individual projects can be obtained from the noted parties.